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PRELIMINARY SURVEY OF  
BETHLEHEM STEEL  
LACKAWANNA, NEW YORK

Work performed  
by the  
Health and Safety Research Division  
Oak Ridge National Laboratory  
Oak Ridge, Tennessee 37830

March 1980

OAK RIDGE NATIONAL LABORATORY  
operated by  
UNION CARBIDE CORPORATION  
for the  
DEPARTMENT OF ENERGY  
as part of the  
Formerly Utilized Sites--  
Remedial Action Program

BETHLEHEM STEEL  
LACKAWANNA, NEW YORK

At the request of the Department of Energy (DOE, then ERDA), a preliminary survey was performed at the Bethlehem Steel Corporation's plant in Lackawanna, New York (see Fig. 1), on August 26, 1976, to assess the radiological status of those facilities utilized under Atomic Energy Commission (AEC) contract during the period 1949 through 1951. Anthony LaMastra of Bethlehem Steel, who was in charge of radiation safety, provided information about the project, and John Baker assisted in conducting a tour of facilities. R. H. Custer, who was employed at the plant at the time of the project, also provided useful information about the project.

From discussion and review of correspondence related to the project, it appears that the AEC awarded a contract to Bethlehem Steel Corporation in 1949 to develop mill pass schedules for the rolling of natural uranium billets into 3.8-cm rods. The rods were to be used as reactor fuel. The billets were produced and received by rail car from Mallinckrodt Chemical of St. Louis, Missouri. Rolling operations involving uranium were conducted only on weekends due to work commitments at the mill during the weekdays. Rail cars containing billets were believed to have been spotted inside the plant and served as storage for the uranium during the weekdays. These billets were then processed into 3.8-cm-diam rods, cropped and packaged in bundles to reduce bending damage, and shipped. Apparently, all scale, residue, and cropped ends were collected and fine debris was vacuumed as the mills were prepared for other work each week. Even though it appears that AEC personnel were present during the rolling operations, and radiological surveys were conducted, no records are available presently.

#### Present Use of Facilities

The 25.4-cm rolling mill used in contract work continues to be used for metal rolling operations. Any other ancillary equipment which may have been associated with the project was not located during the survey.

### Results of Preliminary Survey

The preliminary survey was conducted by H. W. Dickson of the Oak Ridge National Laboratory and W. T. Thornton of the DOE/Oak Ridge Operations Office. A survey of the 25.4-cm mill and areas surrounding the mill was performed. The survey consisted of direct measurements of alpha activity and beta-gamma dose-rate levels on surfaces. Measurements were made with portable alpha scintillator and Geiger-Mueller survey instruments. All measurements taken at this site resulted in radiation levels that were within typical background levels. Additionally, on May 11, 1976, Anthony LaMastra of Bethlehem Steel Corporation (a health physicist) performed a radiological survey for removable radioactive contamination from the same locations. The results of that survey are contained in the attached report. It was concluded that levels of radioactivity at the Bethlehem Steel plant in Lackawanna, New York, are within available guidelines for unrestricted use and no further DOE survey is recommended.

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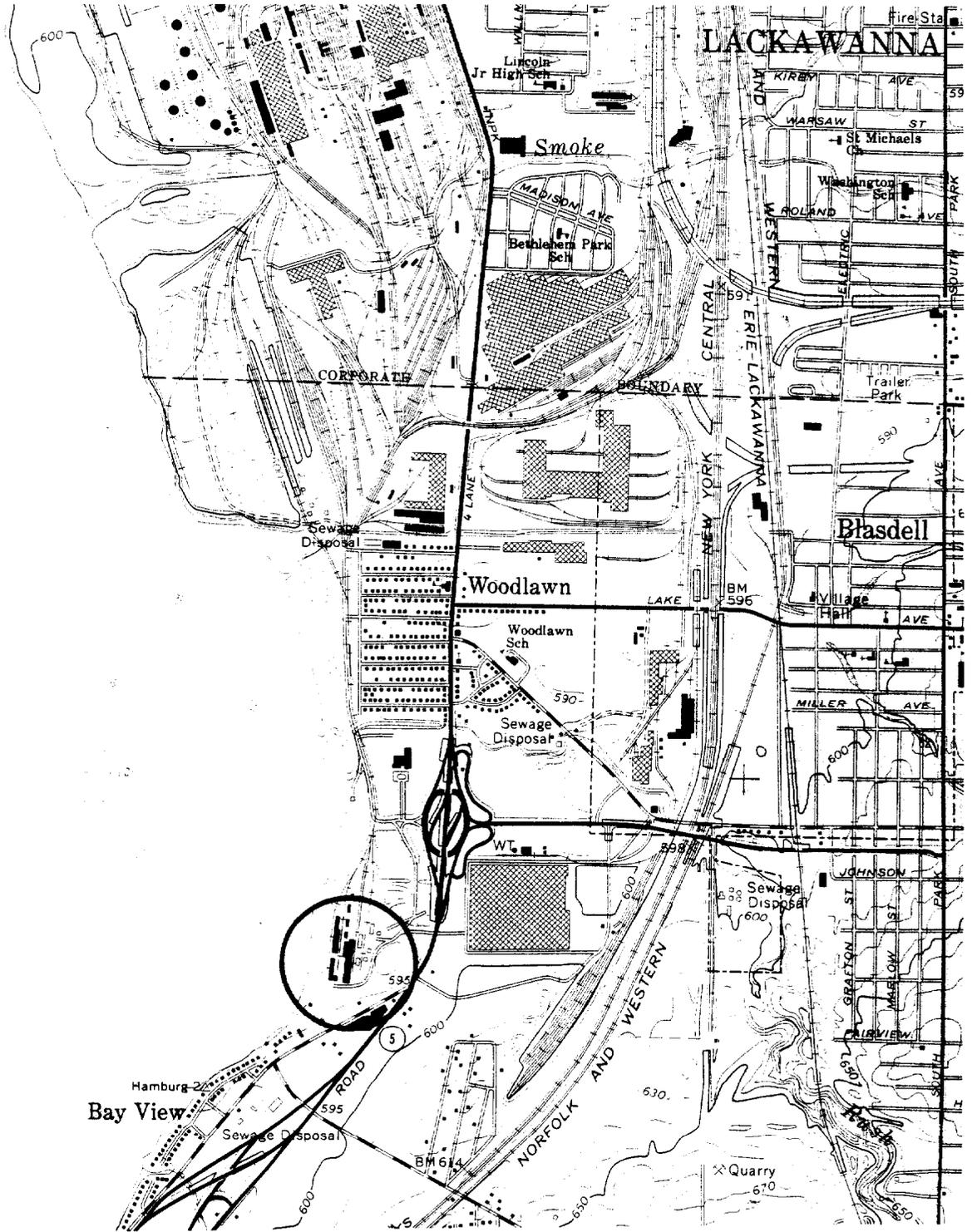


Fig. 1. Location of the Bethlehem Steel site in Lackawanna, New York.

**BETHLEHEM STEEL**

June 29, 1976

FROM A. LaMastra, Radiation Control Engineer

TO D. L. Webster, Chief Environmental Health Engineer

SUBJECT INVESTIGATION REPORT: URANIUM METAL ROLLING,  
10" BAR MILL, LACKAWANNA PLANT

FILE REF.

3/12/77

General Information

On May 7, 1976 an article appeared in the Buffalo Courier Express listing Bethlehem Steel Corporation's Lackawanna Plant as one of several facilities which handled radioactive material for the U. S. Atomic Energy Commission (AEC) during the late 1940's and early 1950's. The U. S. Energy Research and Development Administration (ERDA), formerly the research and development arm of the AEC, had developed a list of 49 sites for which only incomplete records existed. Lackawanna was one of the 49 sites. The initial story was reported by the Washington Star and subsequently picked up by the Buffalo paper. The report in the Star indicated that Federal experts were surveying for possible contamination from lax handling methods, for material possibly buried at the sites, and for possible spreading to other sites.

An investigation by this Division was begun on May 10 along several independent avenues. The following is a summary of the information and recollections we have been able to assemble from Lackawanna Plant employees, from a letter from ERDA (Oak Ridge Operations, letter attached herewith), and from an extensive contamination survey of the 10" Bar Mill.

In 1949, the U. S. AEC was developing mill pass schedules for the rolling of natural uranium billets produced by Mallinckrodt Chemical, St. Louis, Missouri, into 1½-inch rods. The rods were to be used as fuel rods in nuclear reactors. The AEC gave a contract to Bethlehem Steel to develop the necessary pass schedules. All work was completed between 1949 and 1951. The information gained at Lackawanna was used by the AEC in designing a rolling mill at the National Lead Company plant in Fernald, Ohio which began production in 1953.

All developmental work at Lackawanna was limited to weekends. Shipments were received from Mallinckrodt during the week and stored at the mill building. Following rolling, the rods were packaged in bundles and shipped to the AEC. No definitive records of the operations have been found either in former AEC files or at Lackawanna or in Corporate files. According to comments received from National Lead personnel, from a former superintendent of the 10 and 12-inch Bar Mill at Lackawanna, and from ERDA, the Lackawanna rolling was considered "clean". Scale, residue and cropped ends were collected and fine debris was vacuumed. AEC personnel were in attendance during all rolling operations and reportedly performed air and surface radioactive monitoring. It was also indicated that the AEC checked the personnel involved in the rolling for any contamination. (No records are available of this. If records ever did exist, they have not been retained by ERDA.)

On May 11, 56 locations on the 10-inch Bar Mill and associated equipment were tested for radioactive contamination using dry wipes. On May 17, 12 additional rolls for the 10-inch mill, some of which are believed to date back to the time of subject rolling, were found and wiped. All samples were analyzed for both alpha and beta radiation using an internal gas flow proportional counter. No radioactive contamination above natural background was found on any wipe.

Results and Conclusions

1. Although there is a lack of past monitoring records and most of the available information is from the recollection of persons involved, it does not appear that a significant health hazard from radioactivity existed at Lackawanna at any time during or following this project.
2. The high monetary value and the military use of the uranium would result in a high degree of accountability. This would substantiate the extensive clean-up measures taken during the rolling operations.
3. In an intensive survey made subsequent to the news item, no radioactive contamination was found in the mill used during the project.
4. No records have been discovered which describe health physics activities performed during the project. Further inquiry is being made to the U. S. Nuclear Regulatory Commission's New York Office.
5. In summary, there is no evidence to indicate that handling and cleanup methods were lax during the Lackawanna rolling operation, that there is any of the uranium buried on Lackawanna property or in the Buffalo area as a result of the rolling operation, or that there was a spread of contamination to any areas. There is no evidence to indicate that any person has ever been significantly exposed to radiation from this operation. All evidence found thus far indicates that there is no hazard at this operation from radioactive materials.



A. LaMastra

AL:ws

DEVICE	MODEL NO.	SERIAL NO.	SO TYPE	AMOUNT M Pi	LOCATION
1 - 20	21 - 27	28 - 33	34 - 38	39 - 45	46 - 6
SMT NTH HBD EAST END			NAT L		#101 BARI MILL
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MILL FLOOR #114 STAND					" " "
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STAND B11 STAND #115					" " "
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BASEMENT STAND #115					" " "
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MILL FLOOR #115 STAND					" " "
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MILL FLOOR #116 STAND					" " "
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STAND B14 STAND #116					" " "
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STAND B14 STAND #117					" " "
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NO	TEST DATE	TEB SY T	ANALYSIS DATE	ANALYSIS	C FOR	BKGD COUNT	BT K I G H D E	SAMPLE COUNT	SAMPLE T I M E	E F F I C
	1-8	910	11-18	19-20	21	22-28	29-31	32-39	40-42	43-45
	0.5-11-76	MV	0.5-18-76	VK	G	526	10	447	10	1E
	"	MV	"	VK	G	526	10	456	10	1E
	"	MV	"	VK	G	526	10	465	10	1E
	"	MV	"	VK	G	526	10	443	10	1E
	"	MV	"	VK	G	526	10	461	10	1E
	"	MV	"	VK	G	526	10	442	10	1E
	"	MV	"	VK	G	526	10	431	10	1E
	"	MV	"	VK	G	526	10	439	10	1E
	"	MV	"	VK	G	526	10	435	10	1E
	"	MV	"	VK	G	526	10	434	10	1E
	"	MV	"	VK	G	526	10	464	10	1E
	"	MV	"	VK	G	526	10	445	10	1E
	"	MV	"	VK	G	526	10	469	10	1E
	"	MV	"	VK	G	526	10	427	10	1E
	"	MV	"	VK	G	526	10	478	10	1E
	"	MV	"	VK	G	526	10	421	10	1E
	"	MV	"	VK	G	526	10	469	10	1E
	"	MV	"	VK	G	526	10	439	10	1E
	"	MV	0.5-18-76	VK	G	508	10	469	10	1E
	"	MV	"	VK	G	508	10	455	10	1E
	"	MV	"	VK	G	508	10	456	10	1E
	"	MV	"	VK	G	508	10	472	10	1E
	"	MV	"	VK	G	508	10	491	10	1E
	"	MV	"	VK	G	508	10	465	10	1E
	"	MV	"	VK	G	508	10	449	10	1E
	"	MV	"	VK	G	508	10	417	10	1E
	"	MV	"	VK	G	508	10	434	10	1E
	"	MV	"	VK	G	508	10	429	10	1E
	"	MV	"	VK	G	508	10	441	10	1E
	"	MV	"	VK	G	508	10	455	10	1E
	"	MV	"	VK	G	508	10	424	10	1E
	"	MV	"	VK	G	508	10	453	10	1E
	"	MV	"	VK	G	508	10	471	10	1E
	"	MV	"	VK	G	508	10	443	10	1E



NO	TEST DATE	TEBYT	ANALYSIS DATE	ANALYSIS	C FOR	BKGD COUNT	BT G M DE	SAMPLE COUNT	SAMPLE	E F I C
5	1-8	940	11-18	14-20	21	22-28	29-34	32-39	40-42	43-48
	0.5-11-76	MV	0.5-11-76	VK	A	3.0	10	1.0	10	1.0
	"	MV	"	VK	A	3.0	10	1.0	10	1.0
	"	MV	"	VK	A	3.0	10	1.0	10	1.0
	"	MV	"	VK	A	3.0	10	2.0	10	1.0
	"	MV	"	VK	A	3.0	10	0.0	10	1.0
	"	MV	"	VK	A	3.0	10	1.0	10	1.0
	"	MV	"	VK	A	3.0	10	3.0	10	1.0
	"	MV	"	VK	A	3.0	10	3.0	10	1.0
	"	MV	"	VK	A	3.0	10	2.0	10	1.0
	"	MV	"	VK	A	3.0	10	3.0	10	1.0
	"	MV	"	VK	A	3.0	10	1.0	10	1.0
	"	MV	"	VK	A	3.0	10	0.0	10	1.0
	"	MV	"	VK	A	3.0	10	1.0	10	1.0
	"	MV	"	VK	A	3.0	10	2.0	10	1.0
	"	MV	"	VK	A	3.0	10	1.0	10	1.0
	"	MV	"	VK	A	3.0	10	3.0	10	1.0
	"	MV	"	VK	A	3.0	10	4.0	10	1.0
	"	MV	"	VK	A	3.0	10	1.0	10	1.0
	"	MV	"	VK	A	3.0	10	0.0	10	1.0
	"	MV	"	VK	A	3.0	10	1.0	10	1.0
4	0.5-11-76	MV	0.5-18-76	VK	G	526.0	10	501.0	10	1.0
	"	MV	"	VK	G	526.0	10	471.0	10	1.0
	"	MV	"	VK	G	526.0	10	481.0	10	1.0
	"	MV	"	VK	G	526.0	10	470.0	10	1.0
	"	MV	"	VK	G	526.0	10	445.0	10	1.0
	"	MV	"	VK	G	526.0	10	444.0	10	1.0
	"	MV	"	VK	G	526.0	10	419.0	10	1.0
	"	MV	"	VK	G	526.0	10	459.0	10	1.0
	"	MV	"	VK	G	526.0	10	462.0	10	1.0
	"	MV	"	VK	G	526.0	10	456.0	10	1.0
	"	MV	"	VK	G	526.0	10	465.0	10	1.0
	"	MV	"	VK	G	526.0	10	438.0	10	1.0



TEST DATE	T E R S Y T	ANALYSIS DATE	A N A L Y S	C F O R	BKGD COUNT	B T K I G M D E	SAMPLE COUNT	S A M P L E	E F F I C
1-8	9-10	11-18	19-20	21	22-28	29-31	32-39	40-42	43-45
0.5-1.1-76	NV	0.5-1.9-76	VK	G	508.	12	437.	10	1.8
"	NV	"	VK	G	508.	12	429.	10	1.8
"	NV	"	VK	G	508.	10	469.	10	1.8
"	NV	"	VK	G	508.	10	501.	10	1.8
"	NV	"	VK	G	508.	10	449.	10	1.8
"	MU	"	VK	G	508.	10	454.	10	1.8
"	MU	"	VK	G	508.	10	451.	10	1.8
"	NV	"	VK	G	508.	10	471.	10	1.8
"	MU	"	VK	G	508.	10	445.	10	1.8
"	MU	"	VK	G	508.	10	440.	10	1.8
0.5-1.2-76	NV	0.5-1.3-76	VK	A	4.	10	4.	10	1.8
<del>0.5-1.2-76</del>	<del>NV</del>	<del>0.5-1.3-76</del>	<del>VK</del>	<del>A</del>	<del>4.</del>	<del>10</del>	<del>4.</del>	<del>10</del>	<del>1.8</del>
"	NV	0.5-1.3-76	VK	A	4.	10	4.	10	1.8
<del>0.5-1.2-76</del>	<del>NV</del>	<del>0.5-1.3-76</del>	<del>VK</del>	<del>A</del>	<del>4.</del>	<del>10</del>	<del>4.</del>	<del>10</del>	<del>1.8</del>
"	NV	0.5-1.3-76	VK	A	4.	10	4.	10	1.8
<del>0.5-1.2-76</del>	<del>NV</del>	<del>0.5-1.3-76</del>	<del>VK</del>	<del>A</del>	<del>4.</del>	<del>10</del>	<del>4.</del>	<del>10</del>	<del>1.8</del>
"	NV	0.5-1.3-76	VK	A	4.	10	4.	10	1.8
<del>0.5-1.2-76</del>	<del>NV</del>	<del>0.5-1.3-76</del>	<del>VK</del>	<del>A</del>	<del>4.</del>	<del>10</del>	<del>4.</del>	<del>10</del>	<del>1.8</del>
"	NV	0.5-1.3-76	VK	A	4.	10	2.	10	1.8
<del>0.5-1.2-76</del>	<del>NV</del>	<del>0.5-1.3-76</del>	<del>VK</del>	<del>A</del>	<del>4.</del>	<del>10</del>	<del>2.</del>	<del>10</del>	<del>1.8</del>
0.5-1.2-76	NV	0.5-1.3-76	VK	G	531.	10	505.	10	1.8
"	MU	0.5-1.3-76	VK	G	531.	10	456.	10	1.8
"	MU	0.5-1.3-76	VK	G	531.	10	461.	10	1.8
"	NV	0.5-1.3-76	VK	G	531.	10	501.	10	1.8
"	NV	0.5-1.3-76	VK	G	531.	10	428.	10	1.8
"	NV	0.5-1.3-76	VK	G	531.	10	499.	10	1.8

DEVICE	MODEL NO.	SERIAL NO.	SO Tape	AMOUNT M Pi	LOCATION
1 - 20	21 - 27	28 - 33	34 - 38	39 - 45	46 - 65
NORTH END FIELD #1			NAT U		#101 EAST SIDE
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